

# Mark Scheme (Results)

November 2012

GCSE Chemistry  
5CH1H/01

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GCSE Chemistry 5CH1H/01 Mark Scheme – November 2012

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	electrical (energy) / electricity / direct (electric) current	<b>Reject</b> {ac/ alternating current}	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	hydrogen	H <sub>2</sub>	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	A description including (damp blue or red) litmus (paper) (turns red and) bleached / white	<p><b>Allow</b> use of any suitable indicator (1) with correct result (1) eg Universal Indicator (1) is bleached (1) starch-iodide paper (1) turns blue-black (1)</p> <p><b>Allow</b> bleaches indicator (1)</p> <p><b>Do not allow</b> colourless for {bleached/white} if indicator paper is used</p> <p><b>Ignore</b> indicator gets lighter</p> <p><b>Ignore</b> any incorrect middle colour mentioned</p> <p><b>Ignore</b> smells of swimming pools</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
1(b)	<b>B</b> electrolysis		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
1(c)	carbon dioxide	CO <sub>2</sub>	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(d)</b>	<p><math>\text{CuO} + 2 \text{HCl} \rightarrow \text{CuCl}_2 + \text{H}_2\text{O}</math></p> <p>2 (1)  <math>\text{H}_2\text{O}</math> (1)</p> <p>Maximum 1 mark if additional incorrect balancing</p>	<p><b>Reject</b> obvious incorrect symbols and subscripts  eg  <math>\text{h}_2\text{O}</math> (0)    <math>\text{H}^2\text{O}</math> (0)  <math>\text{H}_2\text{o}</math> (0)  <math>\text{H2O}</math> (0)  <b>Ignore</b> state symbols</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)</b>	<b>C</b> hydrocarbons		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)</b>	<b>D</b> power station furnaces		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(i)</b>	$\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$ correct formulae on left $\text{CH}_4 + \text{O}_2$ (1) correct formulae on right $\text{CO}_2 + \text{H}_2\text{O}$ (1) balancing of correct formulae(1)	<b>Allow</b> multiples or halves  <b>Allow</b> = for $\rightarrow$  <b>Reject</b> obvious incorrect symbols and subscripts once only	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(ii)</b>	48 (kJ) (1) or $5472 / 114 = 48$ (kJ) (1) or $5472/114$ (1)		<b>(1)</b>

Question	Answer	Acceptable answers	Mark
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Number			
<b>2(c)(iii)</b>	<p>Any two of</p> <p>easy to ignite / low boiling point / low viscosity (1)</p> <p>{burns readily/easily} / (in)flammable(1)</p> <p>not produce too much {soot/ash/smoke} / burns with {clean/blue} flame / burns cleanly (1)</p> <p>easy to {store/contain} (1)</p> <p>easy to {transport/transfer} (1)</p> <p>high energy output per unit {mass /volume} (1)</p> <p>does not produce {toxic gases/carbon dioxide/sulfur dioxide/greenhouse gases} / contains a low amount of sulfur (1)</p> <p>fuel is {readily available/easy to obtain/will not run out/long lasting/renewable} (1)</p> <p>carbon neutral (1)</p>	<p><b>Ignore</b> burns for a long time</p> <p><b>Ignore</b> just 'releases a lot of energy'</p> <p><b>Ignore</b> references to cost</p> <p><b>Ignore</b> vague answers eg doesn't cause pollution/harmful gases</p> <p><b>Ignore</b> answers written in the form of questions or statements that do not show a characteristic of a <b>good</b> fuel eg how easy is it to ignite the fuel? how much energy it produces</p> <p><b>Allow</b> a little produces a lot of energy</p> <p><b>Allow</b> produces a lot of {miles/km} per {gallon/litre}</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)</b>	<b>B</b> large amount of carbon dioxide and small amount of oxygen		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)(i)</b>	<p><b>Both marks must come from the same pair only, not one from each pair</b></p> <p>An explanation linking</p> <p>EITHER plants (1) photosynthesis / take in carbon dioxide and release oxygen (1) OR oceans / rain / seas / water (1) {dissolve/absorb/take in} gas (1)</p>	<p><b>Allow</b> convert to hydrocarbon (1) iron seeding (1)</p> <p><b>Reject</b> respiration for photosynthesis</p> <p><b>Ignore</b> breathe in carbon dioxide</p> <p><b>Ignore</b> carbon is locked up in rocks</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)(ii)</b>	<p><b>Both marks must come from the same pair only, not one from each pair</b></p> <p>An explanation linking</p> <p>burning/ (complete) combustion(1) (fossil) fuels/wood/rubbish/plastic etc (1) or plants/animals/organisms (1) respiration / gas exhaled / breathing / decaying (1) or volcanic activity/volcanoes (1) eruption (releases gas) (1)</p>	<p><b>Ignore</b> just 'deforestation'</p> <p><b>Ignore</b> just 'farming'</p> <p><b>Allow</b> any type of fuel except hydrogen</p> <p><b>Allow</b> heating limestone (2)</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
3(c)	A description including  limewater (1)  turns milky/cloudy/white precipitate (1)	<b>Ignore</b> heat  <b>Reject</b> observation if incorrect reagent eg bromine water or water	(2)

Question Number	Answer	Acceptable answers	Mark
3(d)	<p><b>All marks must come from the same section only, do not mix and match</b></p> <p>An explanation linking:</p> <p>EITHER</p> <p><b>First 2 marking points</b> concentration of carbon dioxide increases (steadily) (1) but the temperature {fluctuates/increases and decreases} (1)</p> <p><b>Third marking point</b> dependent on at least 1 comment from a graph any 1 from: not all carbon dioxide is produced by human activity (1) none of the graphs refer to human activity (1) there is no proof that human activity causes the temperature to rise (1) other factors could cause the rise in temperature (1)</p> <p>OR</p> <p><b>First two marking points</b> as the (mean global) temperature increases (1) concentration/amount} of carbon dioxide increases (1)</p> <p><b>Third marking point</b> dependent on at least 1 comment from a graph any 1 from: human activity could be causing</p>	<b>Allow</b> the patterns of increase in carbon dioxide and temperature are different (2)	(3)



	<p>the rise in carbon dioxide (1) (world) population has increased (so the amount of carbon dioxide has increased) (1) (increase in) use of { fossil/carbon-based} fuels (produces more carbon dioxide) (1) (increase in) deforestation (decreases the amount of carbon dioxide removed by photosynthesis)</p>		
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Question Number	Answer	Acceptable answers	Mark
<b>4(a)</b>	<b>A</b> chalk		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(i)</b>	1.10 (g) (1) or 1.1 (g) (1) or 2.50 – 1.40 (1)		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(ii)</b>	A suggestion including  heat remaining solid/ heat it for longer / heat it again (1) mass after heating stays the same / gas does not turn limewater milky (1) or add acid (1) no effervescence (1)	<b>Ignore</b> reference to repeating the whole experiment again / heating a new sample of solid  <b>Allow</b> add Universal Indicator and it stays red (after adding acid)	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(iii)</b>	$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$  LHS formulae correct (1) RHS formula correct (1) maximum 1 mark if any incorrect balancing	<b>Allow</b> $\text{Ca(HO)}_2$ <b>Allow</b> multiples <b>Reject</b> obvious incorrect symbols and subscripts once only	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)</b>	initial total mass = 11.00 + 10.50 (1) = 21.50/21.5 (g) total mass remaining = 21.50 – 1.00 (1) = 20.50/20.5 (g)  marks are for the working	20.50/20.5 (g) with no working (2)  <b>Allow</b> 11.00 + 10.50 + 1.00 = 22.5/22.50 (g) (1)  22.5/22.50 (g) with no working (0)  <b>Allow</b> correct working with incorrect answers	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(d)</b>	<p>An explanation linking two of</p> <p>{ neutralises / reacts with / removes / destroys/ gets rid of / takes in} the (waste) gases(1)</p> <p>acid(ic) (gases) / carbon dioxide / sulfur dioxide / oxides of nitrogen (1)</p>	<p><b>Ignore</b> calcium carbonate is a base/alkali</p> <p><b>Allow</b> stops (the waste gases) being released</p> <p><b>Allow</b> {reduces/prevents} acid rain (1)</p> <p><b>Ignore</b> toxic (gases)</p> <p><b>Allow</b> acidic waste</p>	<b>(2)</b>

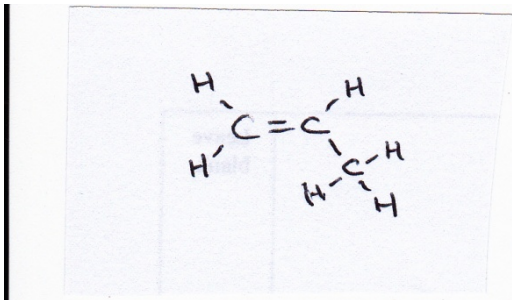
Question Number	Answer	Acceptable answers	Mark
5(a)(i)	carbon (is oxidised)	Just 'carbon dioxide' (0)	(1)

Question Number	Answer	Acceptable answers	Mark
5(a)(ii)	<p><b>Maximum 1 mark if answer only mentions one of the metals.</b></p> <p>An explanation linking two of iron is lower in reactivity than aluminium/OR A (1)</p> <p>carbon can remove the oxygen from iron oxide (1)</p> <p>electrolysis is a more powerful method (than using carbon) / electrolysis is needed to {remove the oxygen from/reduce} aluminium oxide (1)</p> <p>iron compounds less stable than aluminium compounds/OR A (1)</p>	<p><b>Allow</b> carbon is more reactive than iron /OR A(1)</p> <p><b>Allow</b> aluminium is more reactive than carbon /OR A (1)</p> <p><b>Ignore</b> carbon can reduce iron oxide</p> <p><b>Ignore</b> electrolysis is used to extract aluminium</p>	(2)

Question Number	Answer	Acceptable answers	Mark
<b>5(b)</b>	<p>An explanation linking three of atoms of gold all the same (size) (1)</p> <p>in pure gold {layers/rows/sheets/lines} of the {gold / metal} atoms slide over each other (when force is applied) (1)</p> <p>copper atoms are {smaller / different size} (1)</p> <p>(copper atoms) {disrupt / distort /disturb} the {structure / layers} (1)</p> <p>stops {layers/rows/sheets/lines} of gold atoms from sliding over each other (1)</p>	<p><b>Reject</b> the use of the word molecule once only</p> <p><b>Allow</b> particles</p> <p>If layers/rows/sheets/lines is omitted twice, you can award one mark.</p>	<b>(3)</b>

Question Number	Indicative Content	Mark																												
QWC	<p data-bbox="245 264 341 293"><b>*5(c)</b></p> <p data-bbox="379 264 1174 293">An explanation including some of the following points</p> <table border="1" data-bbox="379 293 1369 1485"> <thead> <tr> <th data-bbox="389 300 876 329">Use</th> <th data-bbox="876 300 1369 329">Relevant properties</th> </tr> </thead> <tbody> <tr> <td colspan="2" data-bbox="389 329 1369 358"><b>Aluminium</b></td> </tr> <tr> <td data-bbox="389 358 876 577">aeroplanes, cars, bicycles, trains, trucks, ladders, window frames, door frames, greenhouses, pylons, ship masts, walking poles, golf clubs, baseball bats</td> <td data-bbox="876 358 1369 577">low density (allow light), strong, resistant to corrosion</td> </tr> <tr> <td data-bbox="389 577 876 685">(overhead) power/electricity cables</td> <td data-bbox="876 577 1369 685">low density (allow light), good conductor of electricity, resistant to corrosion</td> </tr> <tr> <td data-bbox="389 685 876 792">foil, food packaging, cans, sweet wrappers, saucepans, blister packs for pills</td> <td data-bbox="876 685 1369 792">low density (allow light), resistant to corrosion</td> </tr> <tr> <td colspan="2" data-bbox="389 792 1369 822"><b>Copper</b></td> </tr> <tr> <td data-bbox="389 822 876 929">electrical wires/cables, lightning conductors, electromagnets</td> <td data-bbox="876 822 1369 929">good conductor of electricity</td> </tr> <tr> <td data-bbox="389 929 876 1037">water pipes, roofing, coins, jewellery, statues, musical instruments</td> <td data-bbox="876 929 1369 1037">resistant to corrosion</td> </tr> <tr> <td colspan="2" data-bbox="389 1037 1369 1066"><b>Gold</b></td> </tr> <tr> <td data-bbox="389 1066 876 1173">jewellery, coins, in dentistry</td> <td data-bbox="876 1066 1369 1173">excellent resistance to corrosion, valuable, low strength</td> </tr> <tr> <td data-bbox="389 1173 876 1258">electronic devices, circuit boards, switch contacts</td> <td data-bbox="876 1173 1369 1258">excellent conductor of electricity</td> </tr> <tr> <td colspan="2" data-bbox="389 1258 1369 1288"><b>Silver</b></td> </tr> <tr> <td data-bbox="389 1288 876 1395">jewellery, cutlery, coins</td> <td data-bbox="876 1288 1369 1395">very good resistance to corrosion, valuable, low strength</td> </tr> <tr> <td data-bbox="389 1395 876 1480">electronic devices, circuit boards, switch contacts</td> <td data-bbox="876 1395 1369 1480">excellent conductor of electricity</td> </tr> </tbody> </table> <p data-bbox="379 1485 1369 1740">           General points            A property must be relevant to the use and from the table in the question.            Ignore additional properties.            Look for the use first, then the relevant property. Candidates who just re-write or compare the properties with no uses score no marks.            Ignore non-specific uses such as building materials/structures, making alloys         </p>	Use	Relevant properties	<b>Aluminium</b>		aeroplanes, cars, bicycles, trains, trucks, ladders, window frames, door frames, greenhouses, pylons, ship masts, walking poles, golf clubs, baseball bats	low density (allow light), strong, resistant to corrosion	(overhead) power/electricity cables	low density (allow light), good conductor of electricity, resistant to corrosion	foil, food packaging, cans, sweet wrappers, saucepans, blister packs for pills	low density (allow light), resistant to corrosion	<b>Copper</b>		electrical wires/cables, lightning conductors, electromagnets	good conductor of electricity	water pipes, roofing, coins, jewellery, statues, musical instruments	resistant to corrosion	<b>Gold</b>		jewellery, coins, in dentistry	excellent resistance to corrosion, valuable, low strength	electronic devices, circuit boards, switch contacts	excellent conductor of electricity	<b>Silver</b>		jewellery, cutlery, coins	very good resistance to corrosion, valuable, low strength	electronic devices, circuit boards, switch contacts	excellent conductor of electricity	<b>(6)</b>
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<b>Level</b>	<b>0</b>	No rewardable content
<b>1</b>	<b>1 - 2</b>	a limited explanation e.g. states correct uses of two metals / explains a use of one of the metals related to a property in the table the answer communicates ideas using simple language and uses limited scientific terminology spelling, punctuation and grammar are used with limited accuracy
<b>2</b>	<b>3 - 4</b>	a simple explanation e.g. states correct uses of three metals and relates one use to a property / explains uses of two metals related to their properties in the table the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately spelling, punctuation and grammar are used with some accuracy
<b>3</b>	<b>5 - 6</b>	a detailed explanation e.g. explains uses of three metals and relates use to property in the table in each case the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately spelling, punctuation and grammar are used with few errors

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	 <p><b>one</b> C=C in a three consecutive carbon atom molecule (1)</p> <p>rest of structure correct, ignore bond angles, conditional on first marking point(1)</p>	allow methyl group written as CH <sub>3</sub>	(2)

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	<b>B</b> C <sub>7</sub> H <sub>16</sub>		(1)

Question Number	Answer	Acceptable answers	Mark
6(b)	<p>A description including</p> <p>add bromine (water) / aqueous bromine (and shake the tube)(1)</p> <p>stays orange / no change / does not go colourless in {propane/alkane} (1)</p> <p>turns colourless / decolorises in {propene/alkene} (1)</p> <p>Maximum 1 mark for 2 correct observations with an incorrect reagent or no reagent specified</p>	<p><b>Allow</b> recognisable spelling for bromine</p> <p><b>Allow</b> yellow / brown or combinations of these for orange</p> <p><b>Ignore</b> just 'red'</p> <p><b>Ignore</b> clear / discoloured</p> <p>one correct test with statement or clear implication that the other must be the other gas for full marks</p> <p>eg add bromine water to both gases, the one that turns it colourless is propene, scores 3 marks as it is clearly implied that the other gas does not turn it colourless</p>	(3)



Question Number	Indicative Content	Mark
<b>QWC</b>	<p><b>*6(c)</b></p> <p>An explanation including some of the following points</p> <p><b>Making the polymer</b>  many propene molecules  join/react together  form a long chain  polymerisation reaction  propene is the monomer  propene is unsaturated / has a double bond  poly(propene) has single bonds  propene is a gas and forms poly(propene) which is a solid  the C=C bond breaks / opens up</p> $n \begin{array}{c} \text{CH}_3 \quad \text{H} \\   \quad   \\ \text{C} = \text{C} \\   \quad   \\ \text{H} \quad \text{H} \end{array} \longrightarrow \left( \begin{array}{c} \text{CH}_3 \quad \text{H} \\   \quad   \\ -\text{C} - \text{C}- \\   \quad   \\ \text{H} \quad \text{H} \end{array} \right)_n$ <p><b>Properties of poly(propene) with related uses</b>  e.g.  property – flexible, low density (lightweight), shatterproof, high softening point, non-toxic, strong, tough, good insulator, water proof, resistant to corrosion, long lasting, can be moulded into shape, can be made into fibres  Uses of poly(propene)  use – to make plastic bags, packaging, buckets, bowls, food containers, ropes, carpets, thermal underwear, Thinsulate items, toys, bottles, bottle caps, laboratory equipment, medical equipment, pipes, car bumpers, crates, furniture, tubing</p>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content
<b>1</b>	<b>1 - 2</b>	a limited explanation of how to make the polymer or properties or uses e.g. propene molecules join together to form the polymer / polypropene can be used to make carpets the answer communicates ideas using simple language and uses limited scientific terminology spelling, punctuation and grammar are used with limited accuracy
<b>2</b>	<b>3 - 4</b>	a simple explanation of how to make the polymer and/or properties and/or uses e.g. propene molecules are monomers and join together to make poly(propene)/ poly(propene) is used to make buckets because it can be moulded into shape the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately spelling, punctuation and grammar are used with some accuracy
<b>3</b>	<b>5 - 6</b>	a detailed explanation including reference to how to make the polymer, its uses and properties e.g. propene molecules have a double bond and poly(propene) can be used to make washing up bowls because it is strong. / propene molecules have a double bond and many of them join together to make polypropene which is used to make ropes. the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately spelling, punctuation and grammar are used with few errors

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